High-Temperature Resistant Energy Storage Containers for Cement Plants in Cambodia

Are sorbent materials a barrier to thermal energy storage?
Provided by the Springer Nature SharedIt content-sharing initiative The lack of robust and low-cost sorbent materials still represents a formidable technological barrierfor long-term storage of (renewable) thermal energy and more generally for Adsorptive Heat Transformations--AHT.

Can calcium aluminate based cement be used as thermal energy storage?
Alonso, M.C.; Vera-Agullo, J.; Guerreiro, L.; Flor-Laguna, V.; Sanchez, M.; Collares-Pereira, M. Calcium aluminate based cement for concrete to be used as thermal energy storage in solar thermal electricity plants. Cem. Concr. Res. 2016, 82, 74-86. [Google Scholar] [CrossRef]

Can TES based on concrete be used for high temperature applications?
One of the first concepts for TES based on concrete for high temperature applicationswas developed and studied by DLR. Laing et al. [12]built a prototype with high-temperature concrete and a storage capacity of approximately 280 kWh.

Are thermal energy storage materials CO2 equivalent?
It is also important to analyze the CO 2 equivalent emissions for manufacturing the thermal energy storage materials themselves. The thermal energy storage materials in this study include firebricks (Al 2 O 3, MgO, SiC), silicon, carbonate minerals, etc.

The lack of robust and low-cost sorbent materials still represents a formidable technological barrier for long-term storage of (renewable) thermal energy and more generally ...

Cost-effective CO2 capture is essential for decarbonized cement production since it is one of the largest CO2 emission sources, where 60% of direct emissions are from CaCO3 ...

The CO 2 generated in the calciner is directly separated with CO 2 as the heat transfer fluid. The proposed process in a cement plant is assessed in the energy, environment, ...

The known performance defects of cement-based wellbore protection and plugging materials in high temperature environment are common key problems affecting the success of ...

Since castable cement offers an inexpensive route to a refractory and chemically compatible material for high temperature molten salts, we are also expecting additional cost savings by ...

The economic performance of diferent energy storage materials is investigated for materials selection. The proposed manufacturing process with a few high-temperature energy ...

The proposed manufacturing process with a few high-temperature energy storage materials (BaCO3/BaO, SrCO3/SrO, Si, etc.) offers a higher CO2 emission reduction and ...

Thermal energy storage (TES) allows the existing mismatch between supply and demand in energy systems to be overcome. Considering temperatures above 150 °C, there ...

However, batch operation imposes a challenge in supplying a continuous heat flow. Therefore, medium-to-high-temperature thermal energy storage technologies could be ...

In terms of total energy use, cement manufacturing accounts for two-thirds of the total energy use in the production of non-metallic materials.

Thermal energy storage (TES) in solid, non-combustible materials with stable thermal properties at high temperatures can be more efficient and economical than other ...

A concept for thermal energy storage (TES) in concrete as solid media for sensible heat storage is proposed to improve the cost and efficiency of solar thermal electricity (STE) ...

Cement-based technologies are emerging as promising alternatives to conventional batteries and thermal storage systems. This article explores how cement is being ...

This study seeks to make a significant impact by developing an advanced concrete tailored for high-temperature applications, including critical uses in thermal energy storage for ...

Pore structure is a key factor affecting the fire resistance of cement-based fireproof materials. In this study, a heat-insulating and heat-resistant ...

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